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January 25, 2001

Ms. Olivia Wilkinson
County of York
Planning Division
224 Ballard Street
Yorktown, VA 23690

RE: York River Treatment Plant
Water Reclamation Facility – Special Use Permit Submission

Dear Ms. Wilkinson:

Enclosed for your review is the following information for the referenced project:

1. Special Use Permit Application (2 pages)
2. Sketch Plan for the proposed pipe alignment
3. $300 application fee
4. Plat of Survey – HRSD Property
5. Plat of Survey – BP/Amoco Property
6. Information packet describing the proposed project in detail

This project will generally involve providing treated effluent from HRSD's York River Treatment Plant to the adjacent BP/Amoco Refinery. To provide this water to BP/Amoco, an 8-inch diameter pipeline will need to be installed. We are considering two alignment alternatives at the present time. Alignment A generally follows Back Creek Road and Godwin Neck Road before entering the refinery and Alignment B involves a directionally drilled crossing of Back Creek Road. Both alignments minimize impacts to adjacent properties and wetland areas. If you have any questions about this proposed project, please let us know.

Your assistance to quickly review and process this application will be greatly appreciated.

Very truly yours,

Bruce W. Husselbee, P.E.
Project Manager

BWH/jlh
Enclosures

YORK RIVER TREATMENT PLANT
WATER RECLAMATION FACILITY

BACKGROUND

For the past few years, HRSD has discussed the possibility of providing reclaimed water for nonpotable industrial uses from its York River Treatment Plant (515 Back Creek Road, Seaford). At the same time, HRSD has considered various polishing systems to meet the water quality needs of both the regulatory agencies and the potential customers for this water. A pilot study was conducted in May 1998 using a cloth membrane filter system, which was found to reduce both influent turbidities and TSS (total suspended solids) to levels acceptable by the Virginia Department of Health and an industry near the York River Treatment Plant (BP Amoco).

BP Amoco has an oil refinery (Yorktown Refinery) immediately adjacent to the York River Treatment Plant. Currently, the industry uses potable water for all onsite water needs, which is purchased from Newport News Waterworks. BP Amoco recognized using drinking quality water for all applications is wasteful to the resource and economically impractical. A continuous portion of their total water demand (approximately 500,000 gallons a day) is used for a category referred to as service water, which includes some cooling towers, process make-up waters, and fire fighting. These service water needs are a good candidate for reclaimed water application.

SCOPE OF WORK

BP Amoco wanted to replace the drinking water with polished secondary treatment plant effluent, if economically justifiable. On December 19, 2000, BP Amoco and HRSD will sign an agreement for HRSD's York River Treatment Plant to provide reclaimed water to BP Amoco's Yorktown Refinery. The project concept includes filtering treated final effluent from the York River Treatment Plant's nonpotable water system, removing excess amounts of ammonia, and pumping the reclaimed water to a storage tank on the BP Amoco property. Chlorine will be added downstream of the filter unit as an additional health precaution and to control nuisance biological growth that could foul the distribution line.

The filter equipment will be contained in the York River Treatment Plant's effluent pump station building. The nonpotable water, which has been both disinfected and dechlorinated, is available adjacent to this building for use as a source with the filter equipment. A discharge pipeline and pumps will be installed to transmit the reclaimed water from the York River Treatment Plant to a storage tank at the BP Amoco Yorktown Refinery.

HRSD will design and install the polishing equipment to provide the additional treatment to the already fully treated secondary effluent. This reclaimed water will be provided in the quality and quantity necessary for the intended uses. In addition, HRSD will construct the necessary modifications to the plant piping system, monitor the water quality, and measure the flow. BP Amoco will abide by

all regulatory stipulations, such as providing safeguards against cross-connects with the drinking water system.

Newport News Waterworks encouraged HRSD to install a separate distribution system for this reclaimed water from the HRSD property line to the industry and for HRSD to retail the water to their existing customers. While reducing drinking water demand from an existing customer (by approximately 500,000 gallons a day), Newport News Waterworks' potable water resources are available for future customers on the Peninsula.

HRSD CONTACTS:
Bruce Husselbee (Engineering Department), Project Manager, 460-7012
George Kennedy (Water Quality Department), Water Reuse Manager, 460-4244

HRSD
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June 29, 2001

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Ms. Olivia Wilkinson
County of York
Planning Division
224 Ballard Street
Yorktown, VA 23690

RE: York River Treatment Plant
Water Reclamation Facility – Special Use Permit Submission

Dear Ms. Wilkinson:

Enclosed for your review is the following information for the referenced project:

1. Special Use Permit Application
2. Sketch Plan for the proposed facilities (2 copies)
3. $300 application fee (previously submitted)
4. Plat of Survey – HRSD Property (previously submitted)
5. Plat of Survey – BP/Amoco Property (previously submitted)
6. Information packet describing the proposed project in detail (previously submitted)

This submission has been prepared to supplement the original application dated January 25, 2001. We offer the following clarifications of the proposed facilities:

1. We plan to install additional treatment facilities on the York River Treatment Plant site to reduce ammonia levels to BP/Amoco. The treatment facilities will include:

   - Sequencing batch reactor including two above grade tanks
   - Tertiary filter, controls and pumps housed in a building with dimensions 25 feet by 40 feet
   - Buried piping and other miscellaneous controls
   - Space for additional facilities if needed in the future for other customers

2. We still propose two pipe alignments to BP/Amoco. The pipe size for either option will be eight inches. One alignment will be installed using a directional drilling method underneath Back Creek. The total length of this alignment option is 4,000 feet. The other alignment will be installed using conventional trenching methods and is located along Back Creek and Goodwin Neck Roads. We plan to alternately bid both options. If the alignment along the roadway is less expensive, then this option will be installed. York County has asked that we upsize the section of pipe along Back Creek Road to 12 inch. We will accommodate this request if York County agrees to pay the incremental cost of increasing the pipe from eight inch to 12 inch.

   If the alignment underneath Back Creek is less expensive, then this option will be installed unless York County agrees to pay the difference in cost between this alignment and the alignment along Back Creek Road. We have been working with the Director of Economic Development, Mr. Jim Noel, regarding this issue. The total length of this alignment option is 11,000 feet.

Your assistance to quickly review and process this application will be greatly appreciated.

Very truly yours,

Bruce W. Husselbee, P.E.
Project Manager

BWH/jlh
Enclosures

bp

BP Amoco Yorktown Refinery
P.O. Box 578
Grafton, Virginia 23690-0578

January 18, 2001

Olivia Wilkinson, Planner
County Of York
Planning Division
P.O. Box 532
Yorktown, VA 23690

HRSD - BP Amoco York River Water Reclamation Project

The Hampton Roads Sanitation District (HRSD) plans to submit a special use permit application to construct a pipeline from their York River Water Treatment plant in Seaford to BP Amoco's adjacent refinery. The pipeline will carry reclaimed wastewater that the refinery plans to use for cooling equipment as well as fire and dust suppression. This water, which is a further treated effluent, will be very beneficial to the refinery from both an environmental and economic standpoint. Through the use of treated effluent in the place of potable water for many applications, BP Amoco will conserve approximately 500,000 gallons per day of drinking water. The refinery will also save money on the cost of water which will further strengthen its viability. As was previously announced, the Yorktown refinery is currently up for sale. This arrangement will carry forward with the new owner, however, who will benefit from the timely implementation of this project.

This new pipeline is planned to pass through BP Amoco property on both sides of Goodwin Neck road and BP Amoco willingly grants access to HRSD for said use. The pipeline outside of the refinery fence is to be maintained by HRSD and BP Amoco inside of the refinery. In the unlikely event of a leak, the party performing the preventative maintenance on the line would repair the pipeline.

Thank you for your timely consideration of this permit application and feel free to contact me with any questions at (757) 898-9738 or via e-mail at burtonma@bp.com.

Matthew A. Burton

Matthew A. Burton, P.E.

Plant Optimization Engineer

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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Ms. Olivia Wilkinson, Planner
County of York
Planning Division
P. O. Box 532
Yorktown, VA 23690

Dear Ms. Wilkinson:

This letter is in reference to the Hampton Roads Sanitation District's (HRSD) need to obtain a special use permit to construct a nonpotable water line from their York River wastewater treatment plant to the BP Amoco Yorktown refinery. In support of HRSD's special use permit application, please be advised that the Department of Environmental Quality strongly support HRSD in this endeavor. HRSD and BP Amoco efforts to conserve approximately 500,000 gallons per day of drinking water for the peninsula by replacing it with treated effluent is commendable and beneficial to all concerned.

It is a major first step in wastewater reclamation in Virginia and, as public acceptance grows, will benefit all citizens of the Commonwealth. Rather than just returning this highly treated effluent to Virginia's local waterways, this resource is being reclaimed. When and where it is environmentally and economically justified, this reclamation process becomes one of the most efficient and effective ways of enhancing Virginia's water resources.

Please do not hesitate to contact me if further clarification is required.

Sincerely,

Larry Lawson, P.E.
Director - Division of
Water Program Coordination

pc: Frank Daniel, DEQ/TRO

Wastewater Reclamation and Water Reuse in Virginia – INTERESTED?

By the Joint VA AWWA/VWEA Water Reuse Committee,
George Kennedy, Tim Coughlin, Patti Psaris

Water reuse is a Hot Topic in Virginia, and continues to be the subject of interest in many areas of the water industry and in our communities. The importance of this issue to Virginia is highlighted by the House Joint Resolution 662 from the 1999 Virginia legislative session requested the Department of Environmental Quality (DEQ) to study environmental and health issues surrounding land application of treated wastewater and to examine the benefits and risks for wastewater reclamation and water reuse. The study was completed in November 1999.

The study determined that wastewater reclamation and water reuse is already widespread both in the U.S. and the world. Water reuse experiences and regulatory requirements in Florida and North Carolina should be useful to Virginia. The study concluded that properly treated reclaimed wastewater can be utilized, when properly managed, in water reuse projects that are fully protective of both public health and the environment. (Copies of this study are available from the Division of Legislative Services and may be obtained by contacting Legislative Information at (804) 698.1500 and asking for the Bill Room.)

An important recommendation of the study was that the Commonwealth encourage the reclamation and reuse of wastewater effluent. It was also agreed that wastewater reclamation and reuse should be a regulated activity that requires permits. This would be best accomplished through the development of new regulations or, where regulations have already been adopted, guidance on implementation for a comprehensive approach to water reuse in Virginia. The regulations should be protective of the health and safety of the Commonwealth's waters and should be developed from a broadly focused stakeholder perspective. The regulations should allow reclamation and reuse to be economically competitive with other forms of effluent disposal. For ground water recharge, it was recommended that the Commonwealth initiate statewide ground water characterization efforts.

With respect to permitting requirements, the study advised that both general and individual permits should be considered for reclamation and reuse. Reuse permits issued by one agency (DEQ) would avoid conflicts in interpretations and in the decision-making processes among agencies.

For the current year 2000 legislative session, Delegate R. Steven Landes has introduced a bill (HB1282) that would require the State Water Control Board to encourage and establish requirements for reuse of wastewater, as an alternative to discharging to waters of the Commonwealth. At press time, the bill had been assigned to the House Committee on the Chesapeake and it's Tributaries.

While Virginia begins to explore the opportunities for water reuse, it is helpful to first establish a common language for water reuse. This common language would facilitate meaningful discussions between the many stakeholder groups that are vital to the development of effective regulations and guidance for this needed practice in our Commonwealth. Consider the below list of recommended definitions provided by the Joint VAWWA/VWEA Water Reuse Committee as the suggested essential basics for the language of water reuse.

Reclaimed Water
Water, which, as a result of treatment of domestic, municipal or industrial wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur. Specifically excluded from this definition is "gray water."

Recycled Water
Same as "Reclaimed Water"

Reuse Water
Same as "Reclaimed Water"

Water Reuse
The use of reclaimed water for a direct beneficial use or a controlled use that is in accordance with the state and local regulatory requirements.

Water Reclamation
The treatment of domestic, municipal or industrial wastewater, so as to make the water suitable for a direct beneficial use or a controlled use that would not otherwise occur.

Potable Water
Water which conforms to the drinking *water* standards of federal state and local authorities for human consumption.

Direct Potable Reuse
The treatment of community wastewaters to a sufficient degree that they would be acceptable for drinking and for their direct discharge into a single, potable water distribution system. (This practice has been tested, but has not been adopted by, or approved, for any water distribution system in the United States.)

Indirect Potable Reuse
The discharge of appropriately treated wastewaters to surface or underground waters from which water is drawn, provided additional treatment and distributed through a single potable water distribution system.

Non-Potable Water
Any water, including reclaimed water, not meeting the drinking water standards of Federal, State and local authorities for human consumption.

Gray Water
Untreated wastewater from bathtubs, showers, lavatory fixtures, wash basins, washing machines, and laundry tubs. It does not include wastewater from toilets, urinals, kitchen sinks, dishwashers or laundry water from soiled diapers.

The above list is meant to initiate the discussion. All of the terms in this brief list could be refined and the vocabulary expanded as our water reuse understanding and experience increase.

Environmental Benefits of Horizontally-Controlled Directional Drilling

BRUCE W. HUSSELBEE, P.E.
and
RICHARD M. NORMAN, P.E.

Mr. Husselbee is a senior engineer at HDR Engineering Inc.'s Virginia Beach, Virginia, office. Mr. Norman, M. ASCE, is Chief of Construction for the Hampton Roads Sanitation District, Virginia Beach, Virginia.

WHEN Lord Cornwallis gave the order to scuttle his British fleet in the York River, he not only kept his ships from the hands of the Americans and their French allies, but he also affected the design of a sewer force main installed over 200 years later. Preserving historic artifacts within the York River bottom was just one issue that the Hampton Roads Sanitation District (HRSD), working with HDR Engineering Inc. (HDR), encountered during the challenging design and installation of the Gloucester interceptor force main. Numerous other factors also impacted the design, final alignment, and installation method chosen for this pipeline. The existence of wetlands, active shellfish beds, underground soil and groundwater contamination, historic sites, national park land, and navigational access to a critical naval facility located just upstream limited construction activity within the river.

Project Description

The Gloucester interceptor force main project involved a 20-mile extension of the HRSD system from the historic Yorktown area to the Gloucester Courthouse. The new pipeline will provide regional wastewater service to an area now served by septic tanks and a small, overloaded primary treatment plant.

The most challenging aspect of the design and construction was installing 3,500 ft of 30-in. steel pipe underneath the York River. The pipeline river crossing location was determined in large part by the narrowing of the river at Gloucester Point. The York River averages 10,000 ft in width above this location and opens into the Chesapeake Bay below the crossing site. The river's depth at the final crossing location, about 80 ft, also affected the installation method chosen during the project's design phase. Due to the environmental factors mentioned previously, a minimum 30-ft depth of cover below the river bottom was specified. In addition to these concerns, continuous marine navigation in the river could not be hindered due to the United States Navy operation of the Yorktown Naval Weapons Station just upstream of the crossing site.

Future dredging requirements were also considered during the planning and design stages. To meet these design limitations, a horizontally controlled, directionally drilled process was selected for pipeline installation. The project's high visibility and critical importance required designing numerous safeguards to detect potential problems and to increase the pipeline's design life. A fusion-bonded epoxy coating and a liquid epoxy lining were factory-applied to limit external and internal corrosion, respectively. A cathodic protection system was also installed with the pipeline to limit corrosion of the steel pipe. Due to the depth and installation method of the pipeline, a deep-well impressed current system was chosen and included a 300-ft well surrounding five silicon anodes located on the north shore. Test stations were installed on both sides of the river for monitoring current across the pipeline. In addition to a hydrostatic pressure test after installation, a television camera was sent through the pipeline to examine it for defects that could have resulted during the installation procedure.

Potential Environmental Impacts and Advantages

For many years, pipeline projects have been considered to have only temporary construction impacts to the environment. Unfortunately, with the previous development of open land much of the more desirable pipeline corridors have been taken. The pipeline designer must now be more innovative when installing utilities in areas that had once been considered undesirable for pipeline installations. Some issues that must be considered when planning and designing a pipeline project include:

- wetlands and wildlife habitat impacts;
- water and land pollution during construction;
- sedimentation, land disturbance, and impacts to steep sloped areas;
- disposal of unsuitable or dredged material;
- historical and cultural site impacts; and
- navigational impacts during pipeline construction across waterways.

All of these potentially detrimental impacts can be significant problems when considering a conventional cut-and-cover method for pipeline installation. The directional drill process can either minimize or eliminate these impacts.

A substantial advantage of the directional drill process is the resulting limited disturbance to adjacent land and water. The soil and water above the pipeline are not removed, and dewatering operations can be limited to only the drill entry pit. Most material used during the drilling operation—water and bentonite slurry—is normally contained and reused. Water quality impacts are reduced since there is no excavation in the bottom of the river or stream. Detrimental impacts to the benthic community, and in particular shellfish beds, can be eliminated.

Another advantage is the tremendous depth of cover that can be attained. As an example, pipelines in the gas industry have been installed to depths of over 200 ft. The depth of cover is generally a function of site geometry, pipe material strength, and to a lesser extent the installation procedure. Deep installations have applications where poor soils, critical groundwater areas, or future surface development constraints exist.

An advantage inherent in the directional drill process is the short time frame required for installation. This limited construction period reduces the risk from construction related accidents. The value of this quick installation procedure is evidenced when a very short construction time frame is available. Tourism and environmental constraints such as fish spawning can limit allowable construction periods. Damaged water or sewer facilities can be replaced with this process, limiting impacts to customers.

Although the directional drill process has many advantages when compared to cut-and-cover installation procedures, some aspects of the drilling process can adversely impact the environment. These issues, if properly considered in the project's design phase, can be mitigated or even eliminated.

Large quantities of drilling mud, composed of naturally occurring constituents and large quantities of water, must be contained and ultimately placed in a suitable disposal area. Landfills are one disposal option. Acceptable haul routes from the job site to the disposal area should be considered. Samples of the waste material should be tested before placing it in an approved disposal site, particularly if the boring operations are

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being conducted in areas of known soil or groundwater contamination.

A suitable water source is required to prepare the drilling mud. Salt water is not desirable due to its abrasive nature and poor mixing characteristics when combined with the bentonite. A fresh, slightly brackish or potable water supply is therefore required. Impacts to these supplies during withdrawal periods should be considered. Negative impacts that could result from excessive withdrawals include a drawdown of the impacted water body and low pressure residuals in the potable water distribution system.

The most challenging aspect of the York River crossing project was the lack of suitable staging areas. The south shore is located in historic Yorktown, and only one small parcel of land was either undeveloped or not within the National Park Service boundary. This small site was chosen as the drill site, or entry point, for the drilling operations. The entry site had to be large enough to accommodate the contractor's drill rig and mud production and recycling equipment.

The north side became the pipe staging and exit point for the drilling operations. Although the north shore exit site provided a larger area for construction staging, the area was not large enough to allow the contractor to fabricate the entire 3,500-ft pipe length. Specific areas were delineated within the contract documents to give the contractor flexibility to fabricate the pipeline, while limiting impacts to adjacent properties and wetlands. A familiarity with drilling equipment and installation practices is critical when considering whether a location's suitability for the directional drill procedure.

The Construction Process

The horizontally controlled, directional drill technology, which originated in the 1970s for the oil and natural gas industry, has many other applications, including the water and wastewater fields. In southeastern Virginia the primary application has been at stream and river crossings. Local municipalities have previously used this process on three installations ranging in size from 12 to 42 in. in diameter and from 1,800 to 2,500 ft in total length. The construction process used at the York River site is typical for drilled crossings. The primary installation steps included setup, reaming, and pullback.

Setup procedures included contractor mobilization, pipe delivery, pipe fabrication, and testing. Following mobilization and concurrent with the other setup operations, the contractor began the reaming operations.

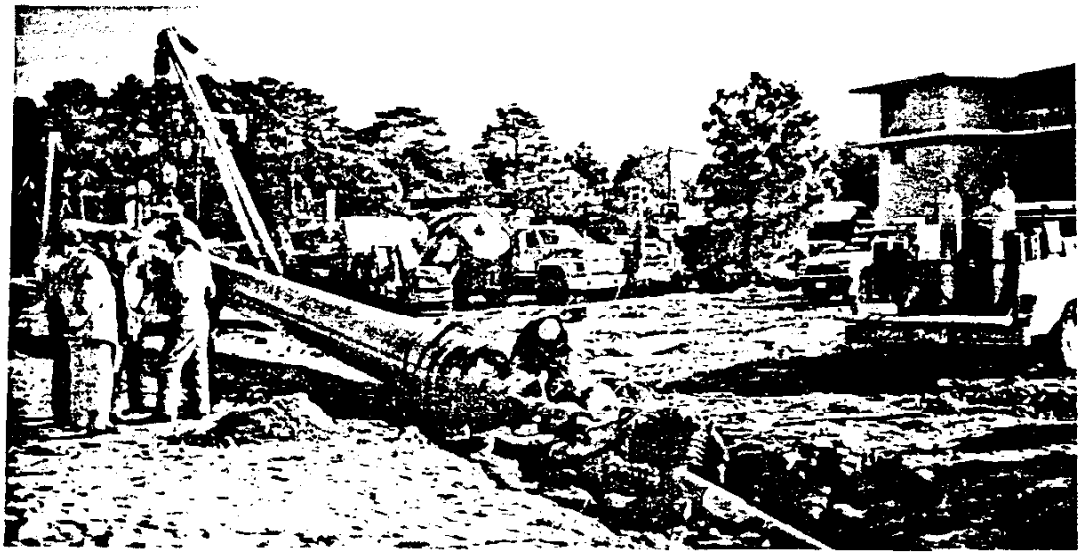
The reaming procedure is the next step in this process, which creates a pathway and removes excess material within the bored hole before pipeline pullback. The operations began by reaming a 2-in. pilot hole. The pilot hole sets the alignment for the pipeline and is the most critical step in the reaming process. The reamer used to set the pilot hole is monitored and adjusted using a down-hole survey system. An electronic survey system provides readings at regular intervals allowing the driller to adjust the drilling angle. Divers placed wires on the river bottom at either side of the crossing to provide an electric current, which was detected by the sensing device in the drill head and provided further guidance for the installation. A bentonite slurry, known as drilling mud and commonly used in the construction of potable water wells, was pumped into the pilot hole throughout the reaming operations. The pressurized slurry fills voids and provides a firm side wall for the pipeline within the drilled hole. The mud slurry also lubricates the pipeline during pullback operations.

Soils encountered during the reaming operations were primarily composed of sand and silt. This allowed for easy reaming, but required numerous passes to provide a firm and stable hole for the pullback operation. Once the initial 2-in. pilot hole was completed, six passes of increasing size were conducted. The final pass utilized a 48-in. diameter reaming bit.

The pullback procedure followed the successfully completed reaming operations. Due to site area limitations at the staging area on the north shore, the contractor chose to fabricate the steel pipe in 500-ft lengths. The first section of pipe was welded to a domed cap. The cap was connected to a swivel that allowed the reamer to rotate without rotating the pipe. The pipe was then pulled back through the bored hole from the north shore to the south shore. The pullback operation continued until the pipe extending into the hole reached the full 500-ft penetration. At this point, the next section of pipe was welded, x-ray tested, recoated using a fusion bonding process, and relined with the epoxy coating. This is a critical period in the pullback process. Drilling contractors normally prefer to conduct one continuous pullback to limit the potential for binding of the pipe in the hole. Each section was successfully welded and recoated. The pipeline was installed in 48-hour round-the-clock operations.

In summary, the horizontally controlled, directional drill process provides owners, engineers, and contractors an option for pipeline installations in areas that were previously considered undevelopable or cost prohibitive. The installation procedure also allowed the contractor to meet a limited construction time frame. This process was indeed found to be cost competitive with more standard cut-and-cover installation procedures. □□□

■ **CONNECTING the steel pipe prior to pullback operation. Site constraints limited pulling lengths to 500 feet.**



Waterworks congratulates BP Amoco on water reuse project

by Lee Ann Hartmann, Public Information Specialist, Newport News Waterworks

In December, Newport News Waterworks Director Brian Ramaley joined with community leaders to announce the beginning of a new water-saving initiative, the first of its kind in the State. Under a new agreement, BP Amoco will buy 500,000 gallons per day of reclaimed wastewater from the Hampton Roads Sanitation District's (HRSD) neighboring York River Waste Water Treatment Plant to use as a coolant at the oil company's Yorktown refinery.

Waterworks has supported non-potable reuse of reclaimed wastewater for many years as an element of wise-water use on the Peninsula. Waterworks staff participated in the BP Amoco project, mainly through metering, cross-connection and backflow prevention issues. They have also explored other reuse projects, such as the irrigation pilot testing program with HRSD at Riverview Farm Park in Newport News.

BP Amoco, HRSD, Newport News Waterworks, and its water customers will all benefit from this project:

Amoco will save money because recycled wastewater is cheaper than highly treated drinking water. It also provides them another opportunity to participate in a program that offers environmental protection to the York River.

HRSD will benefit through the reduced flow of treated sewage into the York River.

The 500,000 gallons of drinking water not used by BP Amoco will extend Waterworks' supply of drinking water available for Peninsula residents.

Ramaley was one of the speakers at the December 20 signing ceremony announcing this reuse initiative. He noted that, while employed in California, he had been involved in reuse projects in the Los Angeles area and observed that projects such as this "make a great deal of sense." He also noted that "while the net effect of this project will be the reduction of the demand that we now serve to BP Amoco with potable (drinkable) water, the more important effect will be the wise use, and conservation of, a precious commodity the Peninsula's water resources." BP Amoco will still be a Waterworks customer for drinking water. However, the use of reclaimed wastewater in their refining process allows Waterworks to reserve some of its potable supply for current and future customers. Bruce Husselbee, an engineer for HRSD, observed that 500,000 gallons of recycled water that BP Amoco will purchase each day is "a drop in the bucket" of the 45 million to 65 million gallons of water used each day by the customers of Newport News Waterworks.

Part of HRSD's $1.6 million project cost includes construction of infrastructure that will filter excessive ammonia from the treated wastewater and pump water to the neighboring refinery. The project is being funded by a low cost loan from the Commonwealth of Virginia. Revenue from BP Amoco should cover the cost of HRSD's investment, so sewage rates for homeowners will not be affected.

BP Amoco plan helps conserve water

Recycled fluid will help cool refinery

By Terry Scanlon
Daily Press

BP Amoco agreed Tuesday to buy used water for the next two decades from Hampton Roads' sewer authority as a coolant at the oil company's Yorktown refinery.

Local authorities say the agreement is the first of its kind in Virginia and has several benefits.

It will conserve drinking water for Peninsula residents because the company will be using 500,000 gallons of recycled water each day, instead of drinking water.

It will save BP Amoco money because the recycled water is cheaper.

And it will reduce the amount of pollution flowing into the York River because even treated sewage has traces of toxins, but much of the recycled water will evaporate before making it to the river, said Bruce Husselbee, an engineer with the Hampton Roads Sanitation District.

"I don't see a loser in this project," he said.

The oil company has used drinking water in the conversion of crude oil into gasoline and other products for years. Beginning in June 2002, BP Amoco will filter and use water that comes from showers, kitchen sinks and washing machines. It does not include toilet water.

The Yorktown refinery will be the first industrial plant in Virginia to use recycled water, HRSD officials said. Much of it will be used for cooling and will evaporate without ever reaching the river, officials said.

Using recycled water rather than drinking water might not solve any future water shortages on the Peninsula, but it's a step in the right direction, Husselbee said. He acknowledged the 500,000 gallons of recycled water that BP Amoco will purchase each day is "a drop in the bucket" of the 45 million to 65 million gallons of water used each day by the customers of Newport News Waterworks.

John Curry, a spokesman for BP Amoco, said this agreement gives the company the opportunity to demonstrate its emphasis on improving the environment.

As part of the agreement HRSD, the lone sewage treatment agency for Hampton Roads, will spend $1.6 million to build infrastructure to filter excessive ammonia from the water and pump it to the neighboring refinery. As a health precaution, chlorine will be added along the way.

Sewage rates for homeowners will not be affected by this deal, Husselbee said. HRSD expects to recover its investment through fees from BP Amoco during the next 20 years, Husselbee said.

Terry Scanlon can be reached at 247-7821 or by e-mail at tscanlon@dailypress.com